

Translation

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 11138p	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/010131	International filing date (day/month/year) 11 September 2003 (11.09.2003)	Priority date (day/month/year) 11 September 2002 (11.09.2002)
International Patent Classification (IPC) or national classification and IPC C07F 9/40		
Applicant FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>9</u> sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>3</u> sheets.
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 13 April 2004 (13.04.2004)	Date of completion of this report 17 December 2004 (17.12.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1-19, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages 3-22, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages 1, 2, 23-28, filed with the letter of 13 April 2004 (13.04.2004)
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

- These elements were available or furnished to this Authority in the following language _____ which is:
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 2-6 and 19,20

because:

- ☒ the said international application, or the said claims Nos. 2-6 and 19, 20
relate to the following subject matter which does not require an international preliminary examination (*specify*):

- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 19, 20
are so unclear that no meaningful opinion could be formed (*specify*):

- ☒ the claims, or said claims Nos. 2, 3 are so inadequately supported
by the description that no meaningful opinion could be formed.

- ☒ no international search report has been established for said claims Nos. 4-6

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

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IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
- ☒ the parts relating to claims Nos. 1-20, 22-28

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes III, IV and V

Box IV**Lack of unity of invention**

D1: WO-A-01/74826

The feature with which the applicant proposes to establish novelty and unity of invention is "having more than one organically polymerisable group". The applicant cites the *Römpf Chemielexikon*, which defines polymerisation as a "reaction for building high-molecular compounds, involving a chain growth mechanism" (10th edition, page 3473).

In the opinion of the applicant a hydroxy group does not conform to the definition of an organically polymerisable group.

However, document D1 not only describes the presence of a hydroxy group but also discloses hydroxy group derivatives which can form copolymers through the reaction of an unreacted double bond with other monomers (see D1, page 12, lines 5 to 6; page 14, lines 4 to 12 (*N*-methyloxacrylamide); and page 18, lines 21 to 28).

The present application thus suffers from a lack of unity of invention *a posteriori*, since compounds of the claimed formula (I) with two organically polymerisable (acryl) groups, along with copolymers and homopolymers thereof, are already known from WO-A-01/74826 (document D1) (see page 32, line 12 to page 36, line 2, describing acryl-group-containing compounds in which the hydroxy group can be esterified by *N*-methyloxacrylamide (= - C(O) - NH-CH₂-O-)).

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.	Statement			
	Novelty (N)	Claims	3, 4, 6, 13-18, 22, 24, 26, 28	YES
		Claims	1, 2, 5, 7-12, 23, 25, 27	NO
	Inventive step (IS)	Claims	13-17	YES
		Claims	3, 4, 18, 24, 26, 28	NO
	Industrial applicability (IA)	Claims	1-18, 22-28	YES
		Claims		NO

2. Citations and explanations

See supplemental sheet.

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Continuation of: Boxes III, IV and V

Claims 1, 2, 5 to 12, 23, 25 and 27 (for example) therefore lack novelty.

It is also clear from D1 that the compounds of (for example) formula 6 are suitable, either in isolation or in the form of copolymers, as flame retardants (see D1, page 1, first paragraph).

The present invention addresses the problem of providing polymerisable phosphorus-containing carboxylic acid derivatives containing **more than one** organically polymerisable group. The compounds are intended to influence material properties, and one of the properties that can be influenced is flame retardancy. The use of the compound to influence material properties cannot therefore be regarded as a feature that links the various structures of the monomers of formula (I) (EPC Rule 30). Since there is no other feature that might be considered to perform this function, there is a lack of unity of invention *a posteriori*.

The different inventions are as follows:

1. Claims 1-20 and 22-28 (in part)

Compounds of formula (I) in which X is O and R¹ and R² are not hydroxy.

2. Claims 1-20 and 22-28 (in part)

Compounds of formula (I) in which X is NH or NR⁶ and R¹ and R² are not hydroxy.

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Continuation of: Boxes III, IV and V

3. Claims 1-5, 7-20 and 22-28 (in part)

Compounds of formula (I) in which X is S and R¹ and R² are not hydroxy.

4. Claims 1-28 (in part)

Compounds of formula (I) in which X is O and R¹ or R² is hydroxy.

5. Claims 1-28 (in part)

Compounds of formula (I) in which X is O and R¹ and R² are hydroxy.

6. Claims 1-28 (in part)

Compounds in which X is S or NH and R¹ and/or R² are hydroxy.

Box V

Reasoned statement under Article 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Citations:

D1: WO 01 74826 A (DEN BERGEN HUGUES VAN; VANOVERVELT JEAN CLAUDE (BE); UCB SA (BE)), 11 October 2001 (2001-10-11)

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Supplemental Box

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Continuation of: Boxes III, IV and V

- D2: FR-A-2 767 829 (STURTZ GEORGES), 5 March 1999
(1999-03-05)
- D3: EP-A-0 667 364 (CASSELLA A.-G., GERMANY), 16 August 1995
(1995-08-16)
- D4: DATABASE CROSSFIRE BEILSTEIN [online], Beilstein
Institut zur Förderung der Chemischen Wissenschaften,
Frankfurt am Main, DE: Database accession no. BRN
7176797; BRN 7175561, XP002266661 & HEWITT, D.G. et al.:
AUST. J. CHEM., No. 37, 1984, pages 1631-1642
- D5: US-A-4044075
- D6: DE-A-1495383

In the absence of the priority documents it is assumed that all the claims enjoy the claimed priority. If this assumption later proves to have been incorrect, the category "P(X)" documents cited in the search report could become relevant to the question of whether the claims meet the requirements of PCT Article 33(1). However, claims 1 to 20 and 22 to 28 are delimited against WO02/088222 by the feature "no silicon atom". Whether or not this is justified also depends on the validity of the priority claim.

Invention 1

1. Novelty

With regard to document D1, see the comments above relating to Box IV.

Document D4 relates to two of the compounds excluded from claim 2 but not from claims 1, 6 and 7.

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Continuation of: Boxes III, IV and V

Document D2 describes compounds as per the present invention but in a generic form (claim 1). The compounds of the present invention are novel over D2 because they are selections.

2. Inventive step

It is clear from document D1 (closest prior art) that the compounds of (for example) formula 6 are suitable, either in isolation or in the form of copolymers, as flame retardants (see D1, page 1, first paragraph).

The problem addressed by the present application is that of providing polymerisable phosphorous-containing carboxylic acid derivatives having more than one organically polymerisable group. The compounds are supposed to be used to influence the properties of materials. This problem is already solved by the compounds of formula 6 in D1 (pages 29 and 32 to 36) and polymers thereof (see also examples 5 and 6). The flame retardancy grades are given in table 2 on page 53. The provision of compounds similar to those of D1 and the use of such compounds (claims 3, 4, 18, 24, 26 and 28) cannot therefore be considered to involve an inventive step.

The same applies to documents D2 and D3. Document D4 is of no relevance for the assessment of inventive step.

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Continuation of: Boxes III, IV and V

Relevant prior art documents were not found for all the disclaimers in claim 2.

D4 relates to the first two of the excluded compounds, and D5 relates to the second group of excluded compounds. Unless there are technical reasons for excluding the other groups of compounds from claim 2 (e.g. impossibility of carrying out the invention (PCT Article 5)), the documents concerned should be cited as they could be significant for the assessment of novelty and inventive step. If the invention cannot be carried out, the impracticable subject matter should be taken out of claim 1.

3. The unsearched claims relating to usage products and the preparation thereof would need to be resubmitted as a divisional application in the regional phase.
4. Inventions 2, 3 and 6 are not supported by examples and cannot therefore form the subject matter of claims (PCT Article 6). Inventions 2; 3 and 6 should be deleted from the application on the grounds of lack of support.
5. "Y" in claim 19 is not defined.
6. Disclaimers are only admissible in exceptional cases (see the EPO Guidelines, CIII 4.12: "A claim's subject-matter is normally defined in terms of positive features...") for the exceptions specified in the basic principles in G1/03. Among other things, it

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Continuation of: Boxes III, IV and V

is not permissible to use disclaimers to exclude documents relating to the same technical field, or to attempt to establish inventiveness by way of disclaimers.

Multiple disclaimers constitute a violation of PCT Article 6 (conciseness). The large number of specific and general disclaimers in claim 2 is due to the unjustified scope of the claim. The core of the invention is undoubtedly the provision of a number of new compounds, not of a new class of compounds. Since the class of compounds *per se* is already known from D1 the applicant will have to be satisfied with a narrower scope for the product claims, because the invention consists merely in the addition of a number of new members to the known class of compounds. In view of the circumstances there is no justification for re-claiming the class of compounds with disclaimers that merely exclude such members as have already been identified or are obvious.